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from the researches of Savart, and from pathological data, that these movements are essentially necessary to the production of the most simple sounds; for when these membranes are incapable of being put into a state of vibration, the sounds of the voice are extinguished, and the result is aphonia.

V. "Anatomy and Physiology of the Spongiadæ."—Part III. By J. Scott Bowerbank, LL.D., F.R.S. Received June 18, 1862.

(Abstract.)

This paper is the third part of the Anatomy and Physiology of the Spongiadæ. The author, after pointing out the inefficiency, or rather the non-existence of a definite arrangement of species of sponges, proposes to establish a series of orders, suborders, and genera, the distinguishing characters of which are to be founded on the structural peculiarities of the various organs of the animals which have been described in detail and named in the first and second parts of the paper. The term Amorphozoa, proposed by De Blainville as a designation of the class, is rejected, as all sponges cannot be considered as shapeless, many genera and species exhibiting much constancy in their forms, while that of Porifera, proposed by Dr. Grant, is adopted, as the porous mode of imbibition of nutriment is universal in this class of animals. The author also agrees with Dr. Grant in dividing the class into three great orders, dependent on the nature of the substances of which the skeletons are constructed. These three great divisions are designated by Dr. Grant in the following order:—1st, Keratosa, having skeletons of horny structure, with few or no siliceous spicula; 2nd, Leuconida, the skeletons composed of calcareous spicula; and 3rd, Chalinida, the skeletons constructed of siliceous spicula. The author, for reasons stated in detail in the paper, proposes to change the order of this arrangement, placing the calcareous sponges first, under the designation of Calcarea. The siliceous sponges are placed second, and designated Silicea, while the first order of Dr. Grant, Keratosa, is placed last. With these exceptions of arrangement and designation, the orders are essentially those established by Prof. Grant in his "Tabular View of the primary divisions of the Animal Kingdom."

The first of these orders (Calcarida) has hitherto been represented by the genus *Grantia* only; but as the genus as established by Fleming contains sponges having very differently constructed skeletons, the author has divided the whole of the species of calcareous sponges that have been named and described into the four following genera, *Grantia*, *Leucolenia*, *Leuconia*, and *Leucogypsia*, in accordance with four distinct types of skeleton-structure which are found to exist among the sponges originally arranged under the genus *Grantia* of Fleming.

The second order, Silicea, is very much more extensive than that of Calcarea, and, from the striking varieties it affords in the construction of the skeletons, it allows of a subdivision into seven suborders. The first of these consists of sponges having spiculo-radiate skeletons, and contains thirteen genera, as follows:—*Geodia*, *Pachymatisma*, *Ecionemia*, *Alcyoncellum*, *Polymastia*, *Halyphysema*, *Tethea*, *Halicnemia*, *Dictyocylindrus*, *Phakellia*, *Microciona*, *Hymeraphia*, and *Hymedesmia*.

The second suborder consists of spiculo-membranous sponges; it consists of one genus, *Hymeniacidon*. The third has spiculo-reticulate skeletons; it contains four genera, *Halichondria*, *Hyalonema*, *Isodictya*, and *Spongilla*. The fourth suborder has spiculo-fibrous skeletons; it contains two genera, *Desmacidon* and *Raphyrus*. The fifth suborder has compound reticulate skeletons; it has but one genus, *Diplodemia*. The sixth suborder has solid siliceo-fibrous skeletons; it contains one genus, *Dactylocalyx*. The seventh suborder has canaliculated siliceo-fibrous skeletons, and contains one genus, *Farrea*.

The third order, Keratosa, is also divided into seven suborders. The first, consisting of solid non-spiculate kerato-fibrous skeletons, is represented by one genus, *Spongia*; the legitimate type of the genus being the cup-shaped and finest Turkey sponges of commerce. The second suborder has solid semi-spiculate kerato-fibrous skeletons; it contains at present but one genus, *Halispongia*; the type of which is the coarse massive sponges of commerce from the West Indian Islands. The third suborder has solid, entirely spiculated kerato-fibrous skeletons; it has one genus, *Chalina*: the type of this genus is one of the commonest of the British sponges, *Halichondria oculata* of Johnston. The fourth suborder is characterized by

having simple fistulo-fibrous skeletons; it contains one genus, *Verongia*. The fifth suborder contains sponges which have compound fistulo-fibrous skeletons, and is represented by the genus *Auleskia*. The sixth suborder consists of sponges having regular semi-areno-fibrous skeletons, and is represented by the genus *Stematumenia*. The seventh suborder has irregular and entirely areno-fibrous skeletons; it is represented by the genus *Dysidea*. The whole of these genera (those previously established as well as the new ones proposed by the author) have been characterized in accordance with their anatomical structures.

The author concludes his paper with a dissertation on the discrimination of species, and a general review of those portions of the organization that may be applied with advantage to their scientific description. The principal sources for this purpose being—1st. The spicula. 2nd. The oscula. 3rd. The pores. 4th. The dermal membrane. 5th. The skeleton. 6th. The interstitial membranes. 7th. The intermarginal cavities. 8th. The interstitial canals and cavities. 9th. The cloacal cavities. 10th. The sarcode; and 11th. The ovaria and gemmules. And, finally, directions for the examination and preservation are given, with a few examples of the mode of specific description proposed by the author.

VI. "On the Spectrum of Carbon." By JOHN ATTFIELD, Esq., F.C.S., Demonstrator of Chemistry at St. Bartholomew's Hospital. Communicated by Dr. FRANKLAND. Received June 19, 1862.

(Abstract.)

The author has prismatically examined various flames containing carbon. He finds that certain rays of light are common to ignited oxycarbons, hydrocarbons, nitrocarbons, and sulphocarbons, and concludes that these common rays are those emanating from ignited carbon vapour. By special manipulation he obtains the carbon spectrum with olefiant gas, cyanogen, carbonic oxide, and bisulphide of carbon. Observed by the naked eye, the prevailing colour of ignited carbon is light blue.